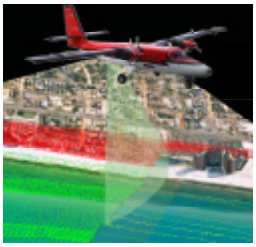
NAVAL METEOROLOGY AND OCEANOGRAPHY NAVIGATION

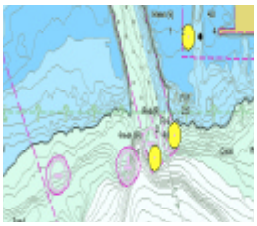
PROVIDING AN ASYMMETRIC WARFIGHTING ADVANTAGE

Navigation: The Naval Oceanography Program is effectively aligned to provide comprehensive oceanographic and navigation knowledge to warfighters. On-scene and reach back personnel, high-tech surveying capabilities, complex models and high-speed data transmissions form a flexible network of near real-time support for navigation. Whether it's assisting mine detection and clearance, ensuring safe passage for submarines and surface ships, or providing special operations forces with advantages in the forward battlespace, Navy Oceanography is engaged to efficiently collect, understand, and apply navigation information to effect advantageous outcomes across strategic, operational, and tactical scales of naval warfare.

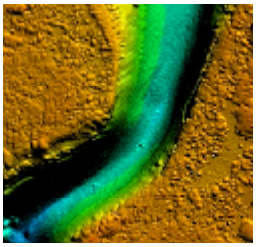


Key components of Navy Oceanography's success are:

- **Knowledgeable Personnel.** Littoral Survey Teams, comprised of military and civilian oceanographers, are deployed globally aboard T-AGS 60 ships and various other platforms to provide quick-response navigation-quality surveys. These teams work in coordination with reach back cells and embedded personnel to deliver environmental information to decision-makers.



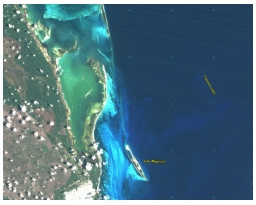
- **Airborne LIDAR Bathymetry.** Using airborne laser bathymetry, Navy Oceanography can provide navigation-quality charts for large areas of coastline. These rapid-response surveys are important for warfighter planning and operations in littoral regions, especially where knowledge is limited or non-existent. The Navy's airborne charting and mapping system combines hydrographic and topographic data with digital imagery to produce more complete characterizations of littoral regions for improved coastal navigation.



- **Autonomous Underwater Vehicles (AUVs).** The Subsurface Autonomous Mapping System (SAMS) and Seahorse are Navy Oceanography's two programmable, redirectable, free-swimming AUVs. SAMS can conduct physical oceanographic data collection or side-scan sonar bottom-mapping surveys. It has full ocean depth capabilities and can collect 10-12 hours of side-scan data for 40 nautical miles, or up to 16 hours of oceanographic data over 65 nautical miles. The Seahorse AUV is designed to collect high-quality, precision located environmental data from littoral regions. It is capable of pre-programmed independent operations over 72 hours, covering 300 nautical miles.

- **Fleet of Multi-purpose Survey Ships.** Navy's fleet of 7 survey ships and hydrographic survey launches are deployed around the world to make in situ observations and work with reach back personnel to provide near-real-time support for tactical navigation.

- **Navigation and Oceanographic Products.** These include: High-resolution bathymetry; navigation-quality charting (for digital or paper products); bathymetric databases; gravity and bathymetry surveys at sea to support SSBN operations; surveys to locate hazards and determine physical bottom conditions; surveys of harbors and approaches.



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